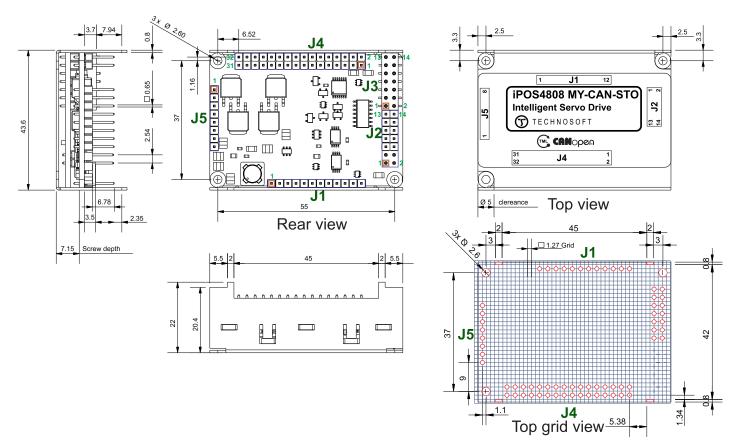


iPOS4808 MY-CAN-STO DATASHEET P/N: P027.314.E111



Rear view; Pins facing upwards; All dimensions are in mm; Header pitch is 2.54 mm. Drawing not to scale.

Motor – sensor configurations								
Motor Sensor	PMSM	BLDC	DC BRUSH	STEP (2-ph)	STEP ² (3-ph)			
Incr. Encoder	T		T	T	T			
Incr. Encoder + Hall	T	T						
Analog Sin/Cos encoder	T	T	T	3	3			
SSI	T	T	T	T	3			
BiSS-C	T	T	T	7	3			
EnDAT ¹	T	T	T	T	3			
Linear Halls	T							
Tacho			T					
Open-loop (no sensor)				T	©			

- ¹ Available starting with F514K firmware version
- ² Sensor used only for step loss detection

Features

- Motion controller and drive in a single compact unit based on MotionChip [™] technology
- Universal solution for control of rotary and linear brushless, brushed and 2 or 3-phase step motors
- Advanced motion control capabilities (PVT,S-curve, electronic cam)
- Motor supply: 11-50V; Logic SELV/ PELV supply: 9-36V; STO SELV/ PELV supply: 18-40V
- Output current: 8A cont. (BLDC mode); 20A_{PEAK}, up to 100kHz PWM
- Feedback Devices (dual-loop support)
 - 1st feedback devices supported:

- Incremental encoder interface (single ended or differential)
- pulse & direction interface (single ended) for external (master) digital reference
- Analogue sin/cos encoder interface (differential 1V_{pp})
- Digital Hall sensor interface (single-ended and open collector)
- Linear Hall sensors interface
- 2nd feedback devices supported:
- ■Incremental encoder interface (differential)
- pulse & direction interface (differential) for external (master) digital reference
- BISS-C / SSI / EnDAT¹ encoder interface
- STO: 2 safe torque-off inputs, safety integrity level (SIL3/Cat3/PLe) acc. to EN61800-5-1;-2/ EN61508-3;-4/ EN ISO 13849-1.
- 6 digital inputs, 12-36V, PNP/NPN programmable: 2 for limit switches, 4 general-purpose
- 5 digital outputs, 5-36V, 0.5A, NPN open-collector: Ready, Error, 3 general-purpose
- 2 analogue inputs: 12-bit, 0-5V: Reference, Feedback or general purpose
- RS-232 serial & CAN-bus 2.0B interfaces
- 127 h/w addresses selectable by h/w pins configuration
- 16k x 16 SRAM memory for data acquisition
- 16k x16 E²ROM to store setup data, TML motion programs, cam tables and other user data
- Operating ambient temperature: 0-40°C (over 40°C with derating)
- NTC/PTC analogue Motor Temperature sensor input

Name	First edition	Document template: P099.TQT.564.0001	Last edition	Visa:	
ALN	June 5, 2020		Aprill 24, 2024	GC	
		Title of document	N° document		
(3) TE	CHNOSOFT	HNOSOFT iPOS4808 MY-CAN-STO			
		PRODUCT DATA SHEET		Page: 1 of 5	



Pin

1..10

Name

Reserved

Type

iPOS4808 MY-CAN-STO DATASHEET P/N: P027.314.E111

	Mating Connectors								
Ref	Ref Producer Part No. Description								
J1	Samtec	SSQ-112-01-G-S	1x12 contacts, socket 2.54mm-pitch accepting 0.635mm square pin						
	FCI	87606-307LF	2x7 contacts, socket, 2.54mm-pitch						
J2	TE Connectivity	534206-7	accepting 0.635mm square pin						
J4	Samtec	SSQ-116-01-G-D	2x12 contacts, socket 2.54mm-pitch accepting 0.635mm square pin						
J5	Samtec	SSQ-108-01-G-S	1x8 contacts, High-current socket 2.54mm-pitch accepting 0.635mm square pin						

	Pin	Name	Туре	Description
	1	GND	-	Return ground for all signals. Internally connected to J4 pins 31 and 32, to metallic cover, and to the 3 fixing screws
	2	TMLCAN / CANopen	I	Connect to GND to enable CANopen protocol Leave disconnected for TMLCAN protocol
	3	Axis ID Bit6	ı	
5	4	Axis ID Bit5	ı	
	5	Axis ID Bit4	ı	8 bit H/W Axis ID register.
	6	Axis ID Bit3	ı	Connect pin to GND to set bit to 1.
	7	Axis ID Bit2	ı	Up to 127 H/W axis ID combinations.
•	8	Axis ID Bit1	ı	
	9	Axis ID Bit0	ı	
	10	reserved	-	Reserved for interface extensions†
	11	reserved	-	Reserved for interface extensions†
	12	reserved	-	Reserved for interface extensions†
				The state of the s

	Pin	Name	Туре	Description					
	1	STO1+	ı	Safe Torque Off input 1, positive input (opto-isolated, 18÷40V)	Apply between both STO1+,				
	2	STO2+	ı	Safe Torque Off input 2, positive input(opto-isolated, 18÷40V)	STO2+ and STO1-, STO2-				
	3	STO1-	1	Safe Torque Off input 1, negative return (opto-isolated, 0V)	24V DC from SELV/ PELV				
	4	STO2-	I	Safe Torque Off input 2, negative return (opto-isolated, 0V)	power supply for motor PWM output operation				
	5	LH1	- 1	inear Hall 1 input					
	6	LH2	ı	Linear Hall 2 input					
	7	IN4	- 1	12-36V general-purpose digital PNP/NPN input					
	8	IN5	- 1	12-36V general-purpose digital PNP/NPN input					
72	9	OUT0	0	5-36V 0.5A, general-purpose digital output, NPN open-collector/TTL pull-up					
	10	OUT3/ Ready	0	5-36V 0.5A, drive Ready output, active low, NPN open-collector/TTL pull-up. Also drives the green LED.					
	11	OUT1	0	5-36V 0.5A, general-purpose digital open-collector/TTL pull-up	output, NPN				
	12	OUT2/ Error	0	5-36V 0.5A, drive Error output, active collector/TTL pull-up. Also drives the					
	13	REF	ı	Analogue input, 12-bit, 0-5V. Used to read an analog position, speed or torque reference, or used as general purpose analogue input					
	14	FDBK / LH3	I	Analogue input, 12-bit, 0-5V. Used to read an analogue position or speed feedback (as tacho), or used as general purpose analogue input / or Linear Hall 3 input					

Description

Reserved for Technosoft communication

interface extensions†

	Pin	Name	Туре	Description
	1	IN0	ı	12-36V general-purpose digital PNP/NPN input
	2	IN1	ı	12-36V general-purpose digital PNP/NPN input
	3	IN2/LSP	ı	12-36V digital PNP/NPN input. Positive limit switch input
	4	IN3/LSN	I	12-36V digital PNP/NPN input. Negative limit switch input
	5	B2-/Dir-/CLK- /MA-	1/0	Incr. encoder2 B- diff. input, or Dir, or Clock- for SSI & EnDAT, or Master- for BiSS; has 150 Ω resistor between pins 5 and 7
	6	B1-/Cos-	I	Incr. encoder1 B- diff. input, or analogue encoder Cos- diff. input
	7	B2+/Dir+/CLK+/ MA+	1/0	Incr. encoder2 B+ diff. input, or Dir+-, or Clock+ for SSI & EnDAT, or Master+ for BiSS; has 150Ω resistor between pins 5 and 7
	8	B1+/Cos+	ı	Incr. encoder1 B single-ended, or B+ diff. input, or analogue encoder Cos+ diff. input
	9	A2+/Pulse+/ Data+/SL+	ı	Incr. encoder2 A+ diff. input, or Pulse+, or Data+ for SSI & EnDAT, or Slave+ for BiSS; has 150Ω resistor between pins 9 and 11
	10	A1+/Sin+	I	Incr. encoder1 A single-ended, or A+ diff. input, or analogue encoder Sin+ diff. input
	11	A2- /Pulse-/ Data-/SL-	ı	Incr. encoder2 A- diff. input, or Pulse-, or Data-for SSI & EnDAT, or Slave- for BiSS; has 150 Ω resistor between pins 9 and 11
	12	A1- /Sin-	I	Incr. encoder1 A- diff. input, or analogue encoder Sin- diff. input
4	13	Z2+	I	Incr. encoder2 Z+ diff. input ; has 150Ω resistor between pins 13 and 15
,	14	Z1+	ı	Incr. encoder1 Z single-ended, or Z+ diff. input,
	15	Z2-	ı	Incr. encoder2 Z- diff. input; has 150Ω resistor between pins 13 and 15
	16	Z1-	ı	Incr. encoder1 Z- diff. input
	17	Hall 1	ı	Digital input Hall 1 sensor
	18	CAN Hi	I/O	CAN-Bus positive line(dominant high)
	19	Hall 2	ı	Digital input Hall 2 sensor
	20	CAN Lo	I/O	CAN-Bus negative line (dominant low)
	21	Hall 3	- 1	Digital input Hall 3 sensor
	22	232TX	0	RS-232 Data Transmission
	23	+5V оит	0	5V output supply for I/O usage
	24	232RX		RS-232 Data Reception
	25	Temp Mot	I	NTC/PTC input. Used to read an analog temperature value
	26	Reserved	-	Reserved. Do not connect.
	27	+V _{LOG}	ı	Positive terminal of the logic supply input: 9 to 36V _{DC} from SELV/ PELV type power supply
	28	OUT4	0	5-36V 0.5A, general-purpose digital output, NPN open-collector/TTL pull-up
	29	+Vмот	ı	Positive terminal of the motor supply: 11 to 48V _{DC}
	30	+Vмот	1	Positive terminal of the motor supply: 11 to 48V _{DC}
	31	GND	-	Return ground for all signals. Internally connected
	32	GND	-	to J4 pin 32, to J1 pin 1, to metallic cover, and to the 3 fixing screws

		PRODUCT DATA SHEET		Page: 2 of 5	
TECHNOSOFT		ECHNOSOFT iPOS4808 MY-CAN-STO			
		Title of document	N° document		
ALN	June 5, 2020		Aprill 24, 2024	GC	
Name	First edition	Document template: P099.TQT.564.0001	Last edition	Visa:	

Pin

1,2

7,8

<mark>ප</mark> 3,4

Name

A/A+

B/A-

C/B+

Cr/B-

Type

0

0

Description

Phase B for 3-ph motors, A- for 2-ph steppers, Motor- for DC brush motors

Phase C for 3-ph motors, B+ for 2-ph steppers

Chopping resistor / Phase B- for 2-ph steppers

Phase A for 3-ph motors, A+ for 2-ph steppers,

Motor+ for DC brush motors



iPOS4808 MY-CAN-STO DATASHEET P/N: P027.314.E111

Electrical characteristics

All parameters measured under the following conditions (unless otherwise specified):

- VLOG = 24 VDC; VMOT = 48VDC
- Supplies start-up / shutdown sequence: -any-
- Load current (sinusoidal amplitude / continuous BLDC, DC, stepper) = 8A

Operating Conditi		Min.	Тур.	Max.	Units	
Ambient temperatu		0		40 ¹	°C	
Ambient humidity					90	%Rh
Altitude / pressure ² Altitude (vs. sea level) Ambient Pressure				0 ÷ 2.5	2	Km
Storage Condition		Ambient Pressure	0 ² Min.	0.75 ÷ 1	10.0 Max.	atm Units
				Тур.		
Ambient temperatu	re		-40		100	°C
Ambient humidity		Non-condensing	0		100	%Rh
Ambient Pressure		Nat navianadi annilas ta	0		10.0	atm
ESD capability (Human body mode	(اد	Not powered; applies to any accessible part			±0.5	kV
` _		Original packaging			±15	kV
Mechanical Moun	ting		Min.	Тур.	Max.	Units
Airflow	D-4			al convecti	on³, close	
Spacing required		ween adjacent drives ween drives and nearby	30			mm
for vertical mounting	wal	ls	30			mm
		ween drives and roof-top	20			mm
		ween adjacent drives ween drives and nearby	4			mm
Spacing required for horizontal	wal	ls	5			mm
mounting		ace needed for drive noval	10			mm
		ween drives and roof-top	15			mm
Insertion force		ng recommended mating	TDD	TBD	TBD	N
Extraction force		nectors	TBD	TBD		N
Environmental Ch	arac	teristics	Min.	Typ.	Max.	Units
Size (Length x Width x Height)	Glo	bal size		0 x 43.6 x		mm
widin x Height)	Gio	ibai size	~2.3	36 x 1.72 x	0.87	inch
Weight				43		g
Cleaning agents		cleaning is ommended	Only Water- or Alcohol- base			
Protection degree	Acc UL!	cording to IEC60529, 508		-		
Logic Supply Inpu			Min.	Тур.	Max.	Units
,,,,	Nor	minal values	9		36	V _{DC}
Complement	Absolute maximum values, drive operating but outside guaranteed parameters		8		40	V _{DC}
Supply voltage	con	solute maximum values, itinuous	-0.6		42	V _{DC}
	Absolute maximum values,		-1		+45	V
	surge (duration ≤ 10ms) +V _{LOG} = 12V		l	130	l	1
Supply current		.og = 12V		90	280	mA
		.og = 40V		85		
Motor Supply Inpu	ıt (+'	V _{MOT})	Min.	Тур.	Max.	Units
		minal values	11		50	V _{DC}
	driv	solute maximum values, re operating but outside tranteed parameters	9		52	V _{DC}
Supply voltage	Abs	solute maximum values,	-0.6		54	V _{DC}
	Abs	solute maximum values, ge (duration ≤ 10ms) [†]	-1		57	V
	Idle	go (aa.auon = 101110)		1	5	mA
	Ope	erating	-20	±8	+20	Α
Supply current	sho	solute maximum value, ort-circuit condition			26	А
	(du	ration ≤ 10ms) ^T				

Motor Outputs (A	/A+, B/A-, C/B+, CR		Min.	Тур.	Max.	Units
	for DC brushed, st	eppers				
	and BLDC motors				8	
Naminal autaut	based trapezoidal					
Nominal output current,	for PMSM motors	with FOC				
continuous ⁴	sinusoidal control	sinusoidal			8	Α
COMMINUOUS	amplitude value)					
	for PMSM motors	with FOC				
	sinusoidal control	sinusoidal			5.66	
	effective value)					
Motor output	maximum 2.5s		-20		+20	Α
current, peak	maximum 2.55		-20		+20	Α
Short-circuit protect	tion threshold		±22	±26	±30	Α
Short-circuit protect	tion delay		5	10		μS
	Nominal output cu	rrent:				
On-state voltage	including typical m			±0.3	±0.5	V
drop	connector contact					
Off-state leakage						
current				±0.5	±1	mA
		F _{PWM}				
	Recommended value, for current ripple max. ±5% of full range;	20 kHz	330			-
		40 kHz	150			1
		60 kHz	120			μH
		80 kHz	80			
Motor inductance	$+V_{MOT} = 36 \text{ V}$	100 kHz	60			-
(phase-to-phase)		20 kHz	120			1
	Minimum value, limited by short- circuit protection; +V _{MOT} = 36 V	60 kHz	40			-
			30			
		40 kHz				_ μH -
		80 kHz	15			
		100 kHz	8			
	Recommended	20 kHz	250			_
Motor electrical	value for ±5%	40 kHz	125			_
time-constant	current	60 kHz	100			μs
(L/R)	measurement	80 kHz	63			1
	error	100 kHz	50			
Current	FS = Full Scale ac	curacy		±4	±8	%FS
measurement						70. 0
Digital Inputs	, IN3/LSN, IN4, IN5)	5	Min.	Тур.	Max.	Units
Mode compliance				PN	IP	
	Input floating (wirir	na				
Default state	disconnected)	9		Logic	LOW	
	Logic "LOW"		-10	0	2.2	
	Logic "HIGH"		6.3	-	36	1
	Floating voltage (n	ot	0.0		- 50	1
	connected)	OI.		0		
Input voltage	Absolute maximun	<u> </u>				V
Ĭ	continuous	-10		+39		
	Absolute maximun				1	
+			-20		+40	
	(duration ≤ 1s)		-			1
Input current	Logic "LOW"; pulle	d to GND		0		mA
input duriont	Logic "HIGH"			1.3	2	

Mode compliance			NF	PN		
Default state	Input floating (wiring disconnected)	Logic HIGH				
	Logic "LOW"	-10		2.2		
	Logic "HIGH"	6.3		36		
Input voltage	Floating voltage (not connected)		3		V	
	Absolute maximum, continuous	-10		+36		
	Absolute maximum, surge (duration ≤ 1s)	-20		+40		
lament accomment	Logic "LOW"; Pulled to GND	-1.6	0.6	1	^	
Input current	Logic "HIGH"; Pulled to +24V			0.3	mA	
Input frequency		0		150	kHz	
Minimum pulse		3.3			μs	
ESD protection	Human body model	±2 kV			kV	

¹Operating temperature at higher temperatures is possible with reduced current and power ratings ² iPOS4808 can be operated in vacuum (no altitude restriction), but at altitudes over 2,500m, current and power rating are reduced due to thermal dissipation efficiency.

 $^{^{\}rm 5}$ The digital inputs are software selectable as PNP or NPN

Name	First edition	Document template: P099.TQT.564.0001	Last edition	Visa:
ALN	June 5, 2020		Aprill 24, 2024	GC
		Title of document	N° document	
(I) TE	CHNOSOFT	NOSOFT iPOS4808 MY-CAN-STO		
		PRODUCT DATA SHEET		Page: 3 of 5

 $^{^3}$ In case of forced cooling (conduction or ventilation) the spacing requirements may drop substantially down to zero as long as the ambient temperature is kept below the maximum operating limit

⁴ @20kHz F_{PWM}



iPOS4808 MY-CAN-STO DATASHEET P/N: P027.314.E111

Digital Outputs (OUT0, OUT1, OU OUT4)	T2/Error, OUT3	3/ R	teady,	Min.	Тур.	Max.	Units	
Mode compliance	All outputs (OI OUT2/Error, C			NPN 24V				
	High-Z (floating)							
	or to GND) Immediately		JT0, OUT1, JT4		Logic "	'HIGH"		
Default state	after power- up	Ol	JT2/Error, JT3/ Ready		Logic '	"LOW"		
	Normal	Ol	JT0, OUT1, JT2/Error		Logic "	'HIGH"		
	operation		JT3/Ready		Logic '	"LOW"		
	Logic "LOW"; = 0.5A	out	put current			0.8		
	Logic "HIGH"; output		UT2/Error, UT3/ Ready	2.9	3	3.3		
Output voltage	current = 0, no load	0	UT0, UT1, OUT4	4	4.5	5	٧	
	Logic "HIGH", to +V _{LOG}	ex	ternal load		V_{LOG}			
	Absolute maxi continuous		ŕ	-0.5		V _{LOG} +0.5		
	Absolute maxi (duration ≤ 1s)		m, surge	-1		V _{LOG} +1		
	Logic "LOW",		k current			0.5	Α	
	Logic "LOW", sink current, pulse ≤ 5 sec.					1	Α	
_	Logic "HIGH", source current; external load to GND; V _{OUT} >= 2.0V		OUT2/Error , OUT3/ Ready			2	mA	
Output current			OUT0, OUT1, OUT4			4	mA	
	Logic "HIGH", leakage current; external load to +VLOG; VOUT = VLOG max = 40V				0.1	0.2	mA	
Minimum pulse wic	dth			2			μs	
ESD protection	Human body r	noc	del	±15			kV	
Digital Hall Inputs	(Hall1, Hall2, I	Hal	13)	Min.	Тур.	Max.	Units	
Mode compliance Default state	Input floating (wiring discon	nec	tod)	TTL	/ CMOS / Logic	Open-colle HIGH	ctor	
	Logic "LOW"	1100	nou)		0	0.8		
	Logic "HIGH" Floating voltage	70		2	5			
Input voltage	(not connected Absolute maxi	d)	m surae		4.4		V	
	(duration ≤ 1s)) [†]		-10		+15		
Input current	Logic "LOW"; Logic "HIGH"; pull-up to +5			0	0	5 0	mA	
Minimum pulse wid				2			μs	
ESD protection	Human body r	noc	del	±5			kV	
Encoder1 Inputs (A1/A1+, A1-, B1/E				Min.	Тур.	Max.	Units	
Single-ended mode compliance	Leave negative inputs disconnected			TTL	/ CMOS /	Open-colle	ctor	
Input voltage,	Logic "LOW"			1.8		1.6		
single-ended mode A/A+, B/B+	Floating voltage (not connected)			1.0	3.3		V	
Logic "LOW"			4.4		1.2			
single-ended mode Z/Z+	Logic "HIGH" Floating voltage (not			1.4	4.7		V	
Input current,	connected) Logic "LOW";	Pul	I to GND		5.5	6		
single-ended mode A/A+, B/B+, Z/Z+	Logic "HIGH"; Internal 2.2KΩ pull-up to +5			0	0	0	mA	

	For full RS422 compliance,		TIA/EIA	-422-A		
compliance	see ¹ Hysteresis	±0.06	±0.1	±0.2		
Input voltage, differential mode	Common-mode range (A+ to GND, etc.)	-7		+7	V	
Input impedance,	A1+ to A1-, B1+ to B1-, Z1+		1		kΩ	
differential	to Z1- Single-ended mode, Open-	0		5	MHz	
Input frequency	collector / NPN Differential mode, or Single- ended driven by push-pull	0		10	MHz	
	(TTL / CMOS) Single-ended mode, Open-	1				
Minimum pulse width	collector / NPN Differential mode, or Single-	1			μs	
widti	ended driven by push-pull (TTL / CMOS)	50			ns	
Input voltage, any	Absolute maximum values, continuous	-7		+7	V	
pin to GND	Absolute maximum, surge (duration ≤ 1s) [†]	-11		+14		
ESD protection	Human body model	±1			kV	
Encoder2 Inputs (A2+/Data+, A2-/D Z2-) ²	oata-, B2+/Clk+, B2-/Clk-, Z2+,	Min.	Тур.	Max.	Units	
Differential mode	For full RS422 compliance, see ¹		TIA/EIA	-422-A	1	
compliance	Hysteresis	±0.06	±0.1	±0.2		
Input voltage	Differential mode	-14		+14	V	
	Common-mode range (A+ to GND, etc.)	-11		+14		
Input impedance, differential	A2+, B2+, Z2+ A2-, B2-, Z2-		150		Ω	
Input frequency	Differential mode	0		10	MHz	
Minimum pulse width	Differential mode	50			ns	
Sin-Cos Encoder (Sin+, Sin-, Cos+,		Min.	Тур.	Max.	Units	
		Min.	Typ. 1	Max. 1.25	Units V _{PP}	
(Sin+, Sin-, Cos+, Input voltage,	Cos-) Sin+ to Sin-, Cos+ to Cos- Operational range	-1				
(Sin+, Sin-, Cos+, Input voltage,	Cos-) Sin+ to Sin-, Cos+ to Cos- Operational range Absolute maximum values, continuous		1	1.25		
(Sin+, Sin-, Cos+, Input voltage, differential	Cos-) Sin+ to Sin-, Cos+ to Cos- Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) [†]	-1 -7 -11	1 2.5	1.25	V _{PP}	
(Sin+, Sin-, Cos+, Input voltage, differential	Cos-) Sin+ to Sin-, Cos+ to Cos- Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) [†] Differential, Sin+ to Sin-, Cos+ to Cos- ³	-1 -7	1 2.5 4.7	1.25 4 +7	V _{PP}	
(Sin+, Sin-, Cos+, Input voltage, differential Input voltage, any pin to GND Input impedance	Cos-) Sin+ to Sin-, Cos+ to Cos- Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) [†] Differential, Sin+ to Sin-, Cos+ to Cos- ³ Common-mode, to GND	-1 -7 -11 4.2	1 2.5	1.25 4 +7 +14	V _{PP} V	
(Sin+, Sin-, Cos+, Input voltage, differential Input voltage, any pin to GND	Cos-) Sin+ to Sin-, Cos+ to Cos- Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) Differential, Sin+ to Sin-, Cos+ to Cos- Common-mode, to GND Software selectable, for one sine/cosine period	-1 -7 -11 4.2	1 2.5 4.7	1.25 4 +7 +14	V _{PP} V kΩ kΩ bits	
(Sin+, Sin-, Cos+, Input voltage, differential Input voltage, any pin to GND Input impedance Resolution with	Cos-) Sin+ to Sin-, Cos+ to Cos- Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) [†] Differential, Sin+ to Sin-, Cos+ to Cos- ³ Common-mode, to GND Software selectable, for one sine/cosine period Sin-Cos interpolation	-1 -7 -11 4.2 2 0	1 2.5 4.7	1.25 4 +7 +14	V _{PP} V kΩ kΩ bits kHz	
(Sin+, Sin-, Cos+, Input voltage, differential Input voltage, any pin to GND Input impedance Resolution with interpolation	Cos-) Sin+ to Sin-, Cos+ to Cos- Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) Differential, Sin+ to Sin-, Cos+ to Cos- Common-mode, to GND Software selectable, for one sine/cosine period	-1 -7 -11 4.2	1 2.5 4.7	1.25 4 +7 +14	V _{PP} V kΩ kΩ bits	
(Sin+, Sin-, Cos+, Input voltage, differential Input voltage, any pin to GND Input impedance Resolution with interpolation Frequency	Cos-) Sin+ to Sin-, Cos+ to Cos- Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) [†] Differential, Sin+ to Sin-, Cos+ to Cos- ³ Common-mode, to GND Software selectable, for one sine/cosine period Sin-Cos interpolation Quadrature, no interpolation Human body model	-1 -7 -11 4.2 2 0 0	1 2.5 4.7	1.25 4 +7 +14	V _{PP} V kΩ kΩ bits kHz MHz	
(Sin+, Sin-, Cos+, Input voltage, differential Input voltage, any pin to GND Input impedance Resolution with interpolation Frequency ESD protection	Cos-) Sin+ to Sin-, Cos+ to Cos- Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) [†] Differential, Sin+ to Sin-, Cos+ to Cos- ³ Common-mode, to GND Software selectable, for one sine/cosine period Sin-Cos interpolation Quadrature, no interpolation Human body model uts (REF, FDBK) Operational range	-1 -7 -11 4.2 2 0 0 ±1	1 2.5 4.7 2.2	1.25 4 +7 +14 10 450 10	V _{PP} V kΩ kΩ bits kHz MHz kV	
(Sin+, Sin-, Cos+, Input voltage, differential Input voltage, any pin to GND Input impedance Resolution with interpolation Frequency ESD protection	Cos-) Sin+ to Sin-, Cos+ to Cos- Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) [†] Differential, Sin+ to Sin-, Cos+ to Cos- ³ Common-mode, to GND Software selectable, for one sine/cosine period Sin-Cos interpolation Quadrature, no interpolation Human body model uts (REF, FDBK) Operational range Absolute maximum values, continuous	-1 -7 -11 4.2 2 0 0 ±1 Min.	1 2.5 4.7 2.2	1.25 4 +7 +14 10 450 10 Max.	V _{PP} V kΩ kΩ bits kHz MHz kV	
(Sin+, Sin-, Cos+, Input voltage, differential Input voltage, any pin to GND Input impedance Resolution with interpolation Frequency ESD protection Analog 05V Inp	Cos-) Sin+ to Sin-, Cos+ to Cos- Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) [†] Differential, Sin+ to Sin-, Cos+ to Cos- ³ Common-mode, to GND Software selectable, for one sine/cosine period Sin-Cos interpolation Quadrature, no interpolation Human body model uts (REF, FDBK) Operational range Absolute maximum values,	-1 -7 -11 4.2 2 0 0 ±1 Min.	1 2.5 4.7 2.2	1.25 4 +7 +14 10 450 10 Max. 5	$\begin{array}{c} V_{PP} \\ \\ V \\ \\ k\Omega \\ \\ k\Omega \\ \\ kHz \\ \\ kHz \\ \\ kV \\ \\ \textbf{Units} \\ \end{array}$	
(Sin+, Sin-, Cos+, Input voltage, differential Input voltage, any pin to GND Input impedance Resolution with interpolation Frequency ESD protection Analog 05V Inp Input voltage	Cos-) Sin+ to Sin-, Cos+ to Cos- Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) [†] Differential, Sin+ to Sin-, Cos+ to Cos- ³ Common-mode, to GND Software selectable, for one sine/cosine period Sin-Cos interpolation Quadrature, no interpolation Human body model uts (REF, FDBK) Operational range Absolute maximum values, continuous Absolute maximum, surge	-1 -7 -11 4.2 2 0 0 ±1 Min.	1 2.5 4.7 2.2 Typ.	1.25 4 +7 +14 10 450 10 Max. 5 +18	$\begin{array}{c} V_{PP} \\ V \\ k\Omega \\ k\Omega \\ bits \\ kHz \\ MHz \\ kV \\ \textbf{Units} \\ \end{array}$	
(Sin+, Sin-, Cos+, Input voltage, differential Input voltage, any pin to GND Input impedance Resolution with interpolation Frequency ESD protection Analog 05V Inp Input impedance Resolution with interpolation	Cos-) Sin+ to Sin-, Cos+ to Cos- Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) [†] Differential, Sin+ to Sin-, Cos+ to Cos- ³ Common-mode, to GND Software selectable, for one sine/cosine period Sin-Cos interpolation Quadrature, no interpolation Human body model uts (REF, FDBK) Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) [†]	-1 -7 -11 4.2 2 0 0 ±1 Min.	1 2.5 4.7 2.2 Typ.	1.25 4 +7 +14 10 450 10 Max. 5 +18 ±36	$\begin{array}{c} V_{PP} \\ \\ V \\ \\ k\Omega \\ \\ k\Omega \\ \\ kHz \\ \\ kHz \\ \\ kV \\ \\ \textbf{Units} \\ \\ V \\ \\ k\Omega \\ \\ bits \\ \end{array}$	
(Sin+, Sin-, Cos+, Input voltage, differential Input voltage, any pin to GND Input impedance Resolution with interpolation Frequency ESD protection Analog 05V Inp Input voltage Input impedance Resolution Integral linearity Offset error	Cos-) Sin+ to Sin-, Cos+ to Cos- Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) [†] Differential, Sin+ to Sin-, Cos+ to Cos- ³ Common-mode, to GND Software selectable, for one sine/cosine period Sin-Cos interpolation Quadrature, no interpolation Human body model uts (REF, FDBK) Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) [†]	-1 -7 -11 4.2 2 0 0 ±1 Min.	1 2.5 4.7 2.2 Typ.	1.25 4 +7 +14 10 450 10 Max. 5 +18	$\begin{array}{c} V_{PP} \\ \\ V \\ \\ k\Omega \\ \\ k\Omega \\ \\ bits \\ \\ kHz \\ \\ kV \\ \\ \textbf{Units} \\ \\ \\ V \\ \\ \\ k\Omega \\ \\ \\ bits \\ \\ \\ bits \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$	
(Sin+, Sin-, Cos+, Input voltage, differential Input voltage, any pin to GND Input impedance Resolution with interpolation Frequency ESD protection Analog 05V Inp Input impedance Resolution Input impedance Resolution Offset error Gain error	Cos-) Sin+ to Sin-, Cos+ to Cos- Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) [†] Differential, Sin+ to Sin-, Cos+ to Cos- ³ Common-mode, to GND Software selectable, for one sine/cosine period Sin-Cos interpolation Quadrature, no interpolation Human body model uts (REF, FDBK) Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) [†] To GND	-1 -7 -11 4.2 2 0 0 ±1 Min. 0	1 2.5 4.7 2.2 Typ. 38 12	1.25 4 +7 +14 10 450 10 Max. 5 +18 ±36 ±2 ±10 ±3%	$\begin{array}{c} V_{PP} \\ V \\ k\Omega \\ k\Omega \\ bits \\ kHz \\ kV \\ \textbf{Units} \\ \end{array}$	
(Sin+, Sin-, Cos+, Input voltage, differential Input voltage, any pin to GND Input impedance Resolution with interpolation Frequency ESD protection Analog 05V Inp Input impedance Resolution Integral linearity Offset error Gain error Bandwidth (-3Db)	Sin+ to Sin-, Cos+ to Cos- Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) Differential, Sin+ to Sin-, Cos+ to Cos- Common-mode, to GND Software selectable, for one sine/cosine period Sin-Cos interpolation Quadrature, no interpolation Human body model uts (REF, FDBK) Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) To GND	-1 -7 -11 4.2 2 0 0 ±1 Min. 0 -12	1 2.5 4.7 2.2 Typ. 38 12 ±2	1.25 4 +7 +14 10 450 10 Max. 5 +18 ±36	$\begin{array}{c} V_{PP} \\ V \\ k\Omega \\ k\Omega \\ bits \\ kHz \\ MHz \\ kV \\ \textbf{Units} \\ \end{array}$	
(Sin+, Sin-, Cos+, Input voltage, differential Input voltage, any pin to GND Input impedance Resolution with interpolation Frequency ESD protection Analog 05V Inp Input impedance Resolution Integral linearity Offset error Gain error Bandwidth (-3Db) ESD protection	Cos-) Sin+ to Sin-, Cos+ to Cos- Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) [†] Differential, Sin+ to Sin-, Cos+ to Cos- ³ Common-mode, to GND Software selectable, for one sine/cosine period Sin-Cos interpolation Quadrature, no interpolation Human body model uts (REF, FDBK) Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) [†] To GND	-1 -7 -11 4.2 2 0 0 ±1 Min. 0 -12 0 ±5	1 2.5 4.7 2.2 Typ. 38 12 ±2 ±1%	1.25 4 +7 +14 10 450 10 Max. 5 +18 ±36 ±2 ±10 ±3% 1	$\begin{array}{c} V_{PP} \\ \\ V \\ \\ k\Omega \\ \\ bits \\ \\ kHz \\ \\ kV \\ \\ \textbf{Units} \\ \\ \\ V \\ \\ \\ k\Omega \\ \\ bits \\ \\$	
(Sin+, Sin-, Cos+, Input voltage, differential Input voltage, any pin to GND Input impedance Resolution with interpolation Frequency ESD protection Analog 05V Inp Input impedance Resolution integral linearity Offset error Gain error Bandwidth (-3Db) ESD protection RS-232	Sin+ to Sin-, Cos+ to Cos- Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) Differential, Sin+ to Sin-, Cos+ to Cos- Common-mode, to GND Software selectable, for one sine/cosine period Sin-Cos interpolation Quadrature, no interpolation Human body model uts (REF, FDBK) Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) To GND	-1 -7 -11 4.2 2 0 0 ±1 Min. 0 -12	1 2.5 4.7 2.2 Typ. 38 12 ±2 ±1%	1.25 4 +7 +14 10 450 10 Max. 5 +18 ±36 ±2 ±10 ±3% 1	$\begin{array}{c} V_{PP} \\ V \\ k\Omega \\ k\Omega \\ bits \\ kHz \\ MHz \\ kV \\ \textbf{Units} \\ \end{array}$	
(Sin+, Sin-, Cos+, Input voltage, differential Input voltage, any pin to GND Input impedance Resolution with interpolation Frequency ESD protection Analog 05V Inp Input impedance Resolution Integral linearity Offset error Gain error Bandwidth (-3Db) ESD protection RS-232 Compliance	Sin+ to Sin-, Cos+ to Cos- Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) [†] Differential, Sin+ to Sin-, Cos+ to Cos- ³ Common-mode, to GND Software selectable, for one sine/cosine period Sin-Cos interpolation Quadrature, no interpolation Human body model uts (REF, FDBK) Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) [†] To GND	-1 -7 -11 4.2 2 0 0 ±1 Min. 0 -12	1 2.5 4.7 2.2 Typ. 38 12 ±2 ±1%	1.25 4 +7 +14 10 450 10 Max. 5 +18 ±36 ±2 ±10 ±3% 1 Max232-C	V _{PP} V kΩ kΩ bits kHz MHz kV Units V kΩ bits bits bits bits kHz kV Units	
(Sin+, Sin-, Cos+, Input voltage, differential Input voltage, any pin to GND Input impedance Resolution with interpolation Frequency ESD protection Analog 05V Inp Input impedance Resolution integral linearity Offset error Gain error Bandwidth (-3Db) ESD protection RS-232	Sin+ to Sin-, Cos+ to Cos- Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) Differential, Sin+ to Sin-, Cos+ to Cos- Common-mode, to GND Software selectable, for one sine/cosine period Sin-Cos interpolation Quadrature, no interpolation Human body model uts (REF, FDBK) Operational range Absolute maximum values, continuous Absolute maximum, surge (duration ≤ 1s) To GND	-1 -7 -11 4.2 2 0 0 ±1 Min. 0 -12 0 ±5	1 2.5 4.7 2.2 Typ. 38 12 ±2 ±1%	1.25 4 +7 +14 10 450 10 Max. 5 +18 ±36 ±2 ±10 ±3% 1 Max232-C 115200	$\begin{array}{c} V_{PP} \\ \\ V \\ \\ k\Omega \\ \\ bits \\ \\ kHz \\ \\ kV \\ \\ \textbf{Units} \\ \\ \\ V \\ \\ \\ k\Omega \\ \\ bits \\ \\$	

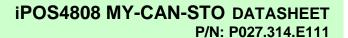
⁴ "FS" stands for "Full Scale"

Name	First edition	Document template: P099.TQT.564.0001	Last edition	Visa:	
ALN	June 5, 2020		Aprill 24, 2024	GC	
		Title of document	N° document		
TE	CHNOSOFT	iPOS4808 MY-CAN-STO	P027.314.E111.DSH.10G		
		PRODUCT DATA SHEET		Page: 4 of 5	
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 $^{^1}$ For full RS-422 compliance, 120 Ω termination resistors must be connected across the differential pairs, as close as possible to the drive input pins.

 $^{^2}$ Encoder2 differential input pins have internal $120\Omega\,\text{termination}$ resistors connected across

 $^{^3}$ For many applications, a 120 $\!\Omega$ termination resistor should be connected across SIN+ to SIN-, and across COS+ to COS-. Please consult the feedback device datasheet for confirmation.





Safe torque OFF (STO1+, STO1-; STO2+, STO2+)		Min.	Тур.	Max.	Units	
Safety function	According to EN61800-5-2	STO (Safe Torque OFF)			FF)	
EN 61800-5-1/ -2	Safety Integrity Level	safety integrity level 3 (SIL3)			SIL3)	
and EN 61508-5-	PFHd (Probability of Failures	8*10 ⁻¹⁰	hou	ur-1 (∩ 0 EI	Τ\	
3/ -4 Classification	per Hour - dangerous)	8*10 ⁻¹⁰ hour ⁻¹ (0.8 FIT)		1)		
EN13849-1	Performance Level		Cat	3/PLe		
Classification	MTTFd (meantime to dangerous		277		years	
Ciassilication	failure)		377 ye			
Mode compliance			Р	NP		
Default state	Input floating (wiring disconnected)		Logic	LOW		
Input voltage	Logic "LOW" (PWM operation disabled)	-20		5.6		
	Logic "HIGH" (PWM operation enabled)	18		36	V	
	Absolute maximum, continuous	-20		+40		
Input current	Logic "LOW"; pulled to GND		0		mA	
	Logic "HIGH", pulled to +Vlog		5	13		
Repetitive test pulses	Ignored high-low-high			5	ms	
(high-low-high)	ignored riign-low-riign			20	Hz	
Fault reaction time	From internal fault detection to register DER bit 14 =1 and OUT2/Error high-to-low			30	ms	
PWM operation delay	From external STO low-high transition to PWM operation enabled			30	ms	
ESD protection	Human body model	±2			kV	
Linear Hall Inputs	(LH1, LH2, LH3)	Min.	Тур.	Max.	Units	
Input voltage	Operational range	0	0.5÷4.5	4.9	V	
Lancetonellane	Absolute maximum values, continuous	-7		+7	.,	
Input voltage	Absolute maximum, surge	-11		+14	V	
	(duration ≤ 1s) [†]					
Input current	Input voltage 0+5V	0		0.2	mA	
Interpolation Resolution	Depending on software settings			11	bits	
Frequency		0		1	kHz	
ESD protection	Human body model	±1	_		kV	
CAN-Bus		Min.	Тур.	Max.	Units	
Compliance			898, CiA-3			
Bit rate	Software selectable	125		1000	Kbps	
Due les eth	1Mbps	-		25		
Bus length	500Kbps ≤ 250Kbps			100 250	m	
Resistor	Between CAN-Hi, CAN-Lo		none	n-board		
Node addressing	Strapping option (AxisID Bit06)	1 - 11	27 ; 255 (a		-	
ESD protection	Human body model	±15	, <u>2</u> 55 (a	51.3 0)	kV	
Supply Output (+5		Min.	Тур.	Max.	Units	
Output voltage	Current sourced = 250mA	4.8	т ур. 5	5.2	V	
Output voltage Output current	Current Sourced = 250mA	600	650	ე.∠	mA	
Short-circuit		000		rotected	шА	
Over-voltage				rotected		

[†] Stresses beyond values listed under "absolute maximum ratings" may cause permanent damage to the device. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

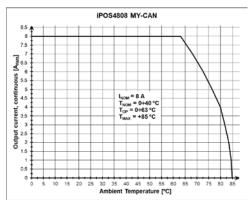


Figure 1. iPOS4808 MY-CAN De-rating with ambient temperature¹

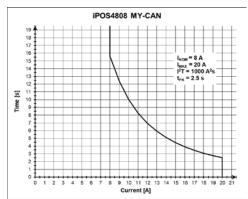


Figure 2. iPOS4808 MY-CAN Over-current diagram¹

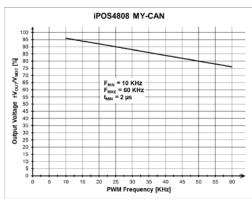


Figure 3. iPOS4808 MY-CAN Output Voltage De-rating with PWM frequency¹

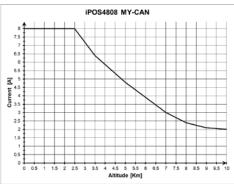


Figure 4. iPOS4808 MY-CAN De-rating with altitude¹

Measured under the following conditions: BLDC; Vmot=48V, Vlog=24V, PWM=20kHZ

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ALN	June 5, 2020		Aprill 24, 2024	GC
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	ECHNOSOFT	iPOS4808 MY-CAN-STO	P027.314.E111.DSH.10G	